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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/802,669	03/16/2004	Wai-Hon Lee	014554-002600US	2673

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EXAMINER
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LIVEDALEN, BRIAN J

ART UNIT	PAPER NUMBER
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2878

DATE MAILED: 02/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

2005

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/802,669	LEE, WAI-HON	
	<b>Examiner</b>	<b>Art Unit</b>	
	Brian J. Livedalen	2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 19 December 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-8, 10, 11 and 13-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8, 10, 11 and 13-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 December 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                                   | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date: _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>10/6/2005</u>   | 6) <input type="checkbox"/> Other: _____                                    |

### **DETAILED ACTION**

This action is in response to amendment filed 12/19/05. Claims 1-8, 10, 11 and 13-15 are pending.

#### ***Claim Objections***

Claim 11 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 11 recites the limitation of an incoherent light source, which is disclosed in claim 10.

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-8, 10, and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Huber et al. (5424833).

In regard to claim 1, Huber discloses (fig. 1) a primary grating (4); an incoherent light source (2) disposed opposing a predetermined side of the primary reflective grating (column 2, line 40); a first reference grating (34a; see column 4, lines 42, 43, grating 3 is replaced by grating 34) disposed between the light source and the primary grating; a

photodetector (5) disposed opposing the predetermined side of the primary grating; a second reference grating (fig. 4, 34b) disposed between the photodetector and the primary grating; wherein the primary grating, the first reference grating and the light source are configured for movement relative to one another; wherein a period of the first reference grating ( $T_r$ ), a period of the second reference grating ( $T$ ) are related to a period of the primary grating ( $T_s$ ) by the formula:  $1/T + 1/T_r = 1/T_s$  (column 2, lines 41-56 in view of Fig. 4). Huber teaches the ratio of  $T_r$  to  $T_s$  being 2:1. Therefore, in the embodiment having two gratings, which appear to have equal periods that are phase shifted,  $T = T_r = 2$ . The equation is met because  $\frac{1}{2} + \frac{1}{2} = 1$ .

In regard to claims 2-8, Huber further discloses (fig. 1) that the primary grating is a moving grating and the first reference grating and second reference grating are fixed gratings; and the elements as set forth above are configured as an optical position encoder device; and the first and second reference grating are configured for identical relative motion with respect to the primary grating (column 1, lines 23-40). Huber further discloses that the moving grating is reflective and the light source can be either an LED or semiconductor laser (column 5, lines 13-15, column 2, lines 37-40).

In regard to claim 10, Huber discloses (fig. 1) a moving grating (4) with period  $T_s$ ; a photodetector (5) with light sensitive components; an incoherent light source (2); a first and second fixed grating (fig. 4, 34a,b) with respective periods  $T$  and  $T_r$ ; wherein the first fixed grating is disposed on the light source; and the second fixed grating is disposed on the light sensitive components; wherein the moving grating is moveable relative to the first fixed grating and the light source (column 2, lines 23-40); wherein a

period of the first reference grating ( $T_r$ ), a period of the second reference grating ( $T$ ) are related to a period of the primary grating ( $T_s$ ) by the formula:  $1/T + 1/T_r = 1/T_s$  (column 2, lines 41-56 in view of Fig. 4). Huber teaches the ratio of  $T_r$  to  $T_s$  being 2:1.

Therefore, in the embodiment having two gratings, which appear to have equal periods that are phase shifted,  $T = T_r = 2$ . The equation is met because  $\frac{1}{2} + \frac{1}{2} = 1$ .

In regard to claim 11, Huber discloses the light source being an incoherent light source (column 2, lines 37-40).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huber et al. (5424833) as applied to claim 10, and in view of Leki et al. (5068530).

In regard to claims 13 and 14, Huber discloses an optical position encoder as set forth above. Huber discloses (fig. 1) a plurality of second gratings with a fixed phase relationship; wherein the moving grating is moveable relative to the first fixed grating and light source. Huber further discloses (fig. 1) that the gratings are sinusoidal. Huber remains silent regarding the gratings functioning to emit only one harmonic component. However, Leki discloses (fig. 1) using multiple gratings in order to emit just one

harmonic component (abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the harmonic elimination taught by Leki to the invention of Huber in order to transmit a more precise signal.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Huber et al. (5424833) in view of Halzapfel et al. (6175414).

In regard to claim 15, Huber discloses (fig. 1) a primary grating (4); an incoherent light source (2) disposed opposing a predetermined side of the primary reflective grating (column 2, line 40); a first reference grating (34a; see column 4, lines 42, 43, grating 3 is replaced by grating 34) disposed between the light source and the primary grating; a photodetector (5); a second reference grating (fig. 4, 34b); wherein the primary grating, the first reference grating and the light source are configured for movement relative to one another; wherein a period of the first reference grating ( $T_r$ ), a period of the second reference grating ( $T$ ) are related to a period of the primary grating ( $T_s$ ) by the formula:  $1/T + 1/T_r = 1/T_s$  (column 2, lines 41-56 in view of Fig. 4). Huber teaches the ratio of  $T_r$  to  $T_s$  being 2:1. Therefore, in the embodiment having two gratings, which appear to have equal periods that are phase shifted,  $T = T_r = 2$ . The equation is met because  $\frac{1}{2} + \frac{1}{2} = 1$ . Huber fails to disclose a photodetector disposed on a far side of the primary grating. However Halzapfel teaches (fig. 1a and 1b) that using transmittance instead of reflectance to measure displacement of a grating is of routine skill in the art. It would have been obvious to one of ordinary skill in the art at the time the invention was made

to place the photodetector on the far side of the grating in order to make the device more compact or take a needed shape or configuration.

### ***Response to Arguments***

Applicant's arguments filed 12/19/05 have been fully considered but they are not persuasive.

Applicant alleges that Huber does not teach an incoherent light source. However, Huber specifically discloses using an LED as a light source (column 2, line 40), which is inherently incoherent.

Applicant also alleges that Huber does not teach the specified relationship  $1/T + 1/T_r = 1/T_s$ . However, Huber discloses a relationship between  $T_r$  and  $T_s$  and then discloses an alternative embodiment in which the grating  $T_r$  is made of two gratings having equal periods that are phase shifted with respect to each other. From the disclosure and drawings, it can be reasonably asserted that Huber discloses the desired relationship between the gratings. *In re Wright*, 569 F.2d 1124, 193 USPQ 332 (CCPA 1977).

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian J. Livedalen whose telephone number is (571) 272-2715. The examiner can normally be reached on 8:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on (571) 272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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